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REPORT TO CONGRESS

IMPACT OF MEDICARE PROSPECTIVE PAYMENT SYSTEM ON ADMISSIONS; NEED FOR VOLUME ADJUSTERS AND/OR PRE-ADMISSION CERTIFICATION

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EXECUTIVE SUMMARY

The Perceived Problem

Past studies of prospective payment systems and hospital payment methods have indicated that once the unit of payment is selected, be it per service, per day of care, per discharge, per case type, or however defined, incentives for hospitals to produce more of these units will exist. As was stated in the Department's December 1982 Report to Congress, Hospital Prospective Payment for Medicare, "pricing discharges or individual case types provides incentives to produce services efficiently, to combine the services efficiently and to control the length of stay, but not to control admissions." (Schweiker, p.36)

Hence, in the enactment of P.L. 98-21, the Congress mandated that the Secretary of Health and Human Services study and report on the impact of Medicare's Prospective Payment System (PPS) on hospital admissions and the feasibility of making a volume adjustment in the DRG prospective payment rates or requiring pre-admission certification in order to minimize the incentive to increase admissions.

Pre-PPS Medicare Admission Trends

From calendar years 1974 to 1983, Medicare admission rates for both aged and disabled beneficiaries grew markedly each year. Short stay admissions per 1,000 aged beneficiaries grew by 20 percent, and total admissions by nearly 50 percent. For the disabled, admission rates grew by over 28 percent as total admissions nearly doubled.

PPS Admission Rates

Since PPS was implemented, contrary to the expectations of many observers, Medicare admission rates clearly have not grown. Medicare admission rates for FY 1984, the first year of PPS, decreased by nearly 3.5 percent (from 395 per 1,000 in FY 1983 to 381 per 1,000 in 1984.) This decrease occurred in all age groups and every geographic area and in nearly every State. The largest rates of decrease were observed in the North Central census region (down 5.3 percent) and the Southern census region (down 3.9 percent), the two regions with historically the highest admission rates. And finally, very preliminary 1985 data suggest that Medicare's admission rate is still declining.

Why Have Admission Rates Not Grown?

Since 1983, the hospital industry generally has begun experiencing declines in admissions among all patient categories, not just for Medicare. The decline for the under age 65 population began in 1981. There are several plausible explanations for this decline including:

a. Improving health status resulting from greater health awareness of consumers.

b. Increasing competition in the health sector as physicians and hospitals generally move toward emulating the performance of HMOs and their typically lower usage of inpatient services.

c. A movement from hospitals to other places of care, such as expanded use of same day outpatient surgery.

For Medicare, some credit may be due to the admission pattern monitoring program launched under TEFRA as well as to the pre-admission certification programs launched by the Peer Review Organizations (PROs). But it should be noted that admission certification systems are also growing in use by competitive private health care plans.

Volume Controls

Volume controls are features of most State rate-setting programs. They typically provide offsetting adjustments for hospitals that experience large volume increases or declines. P.L. 98-21 included a feature of this sort for those sole community hospitals which experience large declines in occupancy following PPS. However, we believe that general use of such a feature in the Medicare PPS payment formula would be an unhealthy deterrant to competition in the general hospital market.

Study Design and Findings

Rand researchers led by Paul Ginsberg, Ph.D., have studied the impact of PPS on admissions, the feasibility of volume adjustments, and pre-admission certification. Their studies provided the bulk of the research for this report.

Admissions impact was studied using a data base developed by the Commission on Professional and Hospital Activities (CPHA). It was found that all else being equal, hospitals on PPS had a 1.0 percentage point lower increase in Medicare admissions than hospitals not yet on PPS during the implementation year. The analysis also suggests that even larger declines occurred coinciding with the commencement of PRO activity. The study also examined outpatient substitution trends and for most DRGs found negative coefficients, which indicated greater shifts out of the hospital relative to pre-PPS trends.

The health economics literature concerning hospital incentives to increase admissions was then reviewed. The earlier literature suggested that volume increases could yield very large surpluses. More recent literature suggests this is not the case. It was concluded that when all costs—both implicit and explicit—are taken into account, it is unlikely that, at a given point in time, the overwhelming majority of hospitals have any strong incentive to increase admissions, because marginal costs are quite similar to average costs when admissions are at or near planned levels. This means that if a hospital's admission volume expands significantly beyond planned levels, marginal costs will exceed average costs and be unprofitable.

The study next examined the provision relating to volume adjusters in six State rate-setting programs and policy options for Medicare's PPS. The investigation found little empirical rationale behind particular adjuster schemes used by States, despite widespread Commission member beliefs in their importance. No literature relevant to PPS and volume adjustments was found.

Possible alternatives for a Medicare volume adjustment were then reviewed and considered. Analysis showed that such features could add administrative complexities. Intermediaries might have to make a retroactive adjustment to each hospital's reimbursement, and hospitals would face uncertainty over their ultimate Medicare payment.

Also, many hospitals experience rather large declines and growths in their Medicare volumes from one year to the next. Inevitably, a significant number of hospitals will find their bases for volume adjustment will be a year when Medicare discharges were unusually high or low. Hospitals in areas with rapid growth of Medicare enrollees could also be severely impacted. Many hospitals would have a base where admissions were above or below a normal or planned level, and reimbursements would be affected by this for an indefinite period.

Medicare's use of a volume adjustment could have two major undesirable results. First, hospital incentives to increase efficiency would be blunted. Second, the desired flow of patients to the most efficient hospitals would be deterred. For example, by employing a volume adjuster, the incentive to turn away Medicare patients is increased dramatically and there is no mechanism for ensuring that those not admitted would benefit least from inpatient services. Problems with volume adjusters stem from the fact that they are designed for a very specific situation—transitory changes in a hospital's volume such that marginal costs of an additional admission are much lower than reimbursement for an additional patient--but interfere with permanent volume changes.

The report ends with an assessment of pre-admission certification programs. It is emphasized that all PROs employ such programs, at least for target DRGs. It also relates private insurer experiences and discusses physician attitudes. The conclusion is that these programs have significant cost saving potential, but the lack of monitoring mechanisms raises a possibility for denials of needed care by third parties in the private sector. It is still much too soon to empirically assess the effectiveness of the various PRO approaches to Medicare pre-admission certification.

Recommendations

The clear implication of the study is that the Medicare program should not include any general volume adjustment feature applicable to all hospitals. To the extent that hospital economic incentives for additional admissions are of a smaller magnitude than previously thought, (and may be nonexistent or negative), the incentives created by volume adjusters may do more harm than good. They pose serious risks of problems of access for some Medicare beneficiaries. Given the recent sharp declines in admissions, which we do not fully understand, we need to be sensitive to inadvertent limitations of access.

The review of pre-admission certification programs concludes that it is not yet possible to objectively decide whether all Medicare admissions should be subjected to pre-admission certification. The present variety of approaches being used by PROs should be continued.

I. INTRODUCTION

Under the Medicare Prospective Payment System (PPS), hospitals are paid a fixed amount per admission and, with the exception of kidney acquisition costs, capital costs, and direct expenditures for medical education, are entirely at risk for costs incurred in serving Medicare patients. While such a payment method unambiguously gives strong incentives to reduce length of stay, during the development of PPS many expressed concern that a fixed payment also provides an incentive to increase the number of admissions.

The reasoning for this concern is as follows: Most hospitals have excess capacity on most days, so the cost of serving an additional patient is less than the average cost of serving a patient, which includes fixed costs. Since payments under PPS have been set to correspond to the average cost of serving a Medicare patient in an average hospital, the revenue obtained from serving an additional patient will often exceed the cost of providing the service. With such rewards held out for admitting an additional patient, hospitals might seek to increase their volume of admissions. If hospitals succeeded in the aggregate, and increased admissions, Medicare outlays would be higher.

In drafting the Social Security Amendments of 1983, the Congress decided to rely on utilization review by Peer Review Organizations (PRO) to deal with possible incentives to increase admissions. But the legislation also called for the Secretary of Health and Human Services to study the issue and report back. The legislation called for a report on the:

> impact (of PPS)...on hospital admissions and the feasibility of making a volume adjustment in the DRG prospective payment rates or requiring preadmission certification in order to minimize the incentive to increase admissions.

To assist the Health Care Financing Administration (HCFA) in responding to the requirements of this legislation, the Rand Corporation has studied these issues and prepared a background report. The next Section reviews the impact of PPS on Medicare admissions. This includes analyses of both trends in aggregate admissions and of trends in those types of admissions that have significant potential for substitution of outpatient services for inpatient care. While, in the absence of a control group, it is difficult to assess what part is associated with PPS, the volume of Medicare admissions has declined substantially, in striking contrast with a previous long-term trend of increasing admissions.

Section III focuses on the incentives to increase admissions under PPS. It includes both a theoretical discussion of a hospital's incentives and a review of the literature on hospital cost functions. This section argues that the theoretical basis for believing that PPS will increase admissions is questionable, and that the most recent hospital cost studies indicate that incentives to increase the volume of admissions are not strong. It discusses other considerations specific to PPS that might affect incentives.

Section IV reviews the experience of State-level rate-setting programs with volume adjusters. Most of the State programs reviewed have used some volume adjuster,

but we could not find any research literature that isolated their effects on volume and costs.

Section V discusses whether the Congress should consider legislating a volume adjuster for PPS. It argues against such a policy, basing the argument on the fact that the initial fears of a problem have not been confirmed, and that volume adjusters may do more harm than good.

Section VI discusses preadmission review. It shows that, while in 1983 the Congress was considering the feasibility of its use in Medicare, PROs began in 1984 to use the tool extensively. Current debates appear to focus mostly on which methods of implementation are best. But since these programs affect significant human and financial resources, their effects warrant careful study.

II. IMPACT OF PPS ON ADMISSIONS

Medicare admissions have declined during the period covered by PPS, in sharp contrast with longstanding trends. Furthermore, there is no evidence of movement from outpatient to inpatient settings. To the contrary, trends in the opposite direction have accelerated somewhat.

AGGREGATE ADMISSIONS

Prior to PPS, Medicare admissions to short-stay hospitals had been increasing. As shown in Table 1, admissions to short-stay hospitals increased at an average annual rate of 4.6 percent from calendar year 1978 to fiscal year 1983, with annual increases ranging from 3.3 percent to 6.6 percent. While increased enrollment explained a portion of this, a higher admission rate per enrollee was a factor of comparable importance. Admissions per thousand enrollees increased at an average annual rate of 2.4 percent.

Trends During PPS

This trend of increasing admissions reversed in fiscal year 1984—the beginning of PPS—and the decline accelerated in the fourth quarter of fiscal year 1984. Table 1 shows that from fiscal year 1983 to fiscal year 1984, admissions declined 1.7 percent, and admissions per thousand enrollees declined 3.5 percent. This is about 6 percentage points below what one would have expected on the basis of extrapolating the prior (1978-1983) trend.

Table 1

MEDICARE SHORT-STAY HOSPITAL ADMISSIONS AND RATE PER THOUSAND HOSPITAL INSURANCE ENROLLEES 1978-84

Year	Admissions (in thousands)	Percent Change	Enrollment as of July 1 (in thousands)	Admissions Per Thousand Enrollees	Perc Char
CY 1978	9,444	---	26,777	353	---
CY 1979	9,788	+3.6	27,459	356	+0.
CY 1980	10,430	+6.6	28,067	372	+4.
CY 1981	10,858	+4.1	28,590	380	+2.
FY 1982	11,220	+3.3	29,069	386	+1.
FY 1983	11,696	+4.2	29,587	395	+2.
FY 1984	11,495[a]	-1.7	30,141[b]	381	-3.

---

[a] Admissions data for FY 1984, adjusted to account for processing lags.

[b] Enrollment figures for July 1, 1984, as projected by HCFA's Bureau of Data Manageme and Strategy.

Source: HCFA, Bureau of Data Management and Strategy.

Table 2

Medicare Short-Stay Hospital Admissions, Fiscal Year 1982 to Date (through March 1985)

					Percent Change		
	FY 82	FY 83	FY84[1]	FY 85[1]	82-82	83-84	84-85
		numbers in thousands					
October	921	954	984	964	3.6	3.1	-2.0
November	901	950	947	888	5.4	-0.3	-6.2
December	866	903	891	862	4.3	-1.3	-3.3
Total - First Quarter	2,688	2,807	2,822	2,714	4.4	0.5	-3.8
January	943	1,052	1,045	1,000	11.6	-0.7	-4.3
February	868	935	959	896	7.7	2.6	-6.6
						-1.8	-8.3
Total - Second Quarter	2,826	3,019	3,017	2,825	6.8	0.1	-6.4
April	962	995	1,001		3.4	0.6	
May	964	1,022	1,004		6.0	-1.8	
June	958	976	932		1.9	-4.5	
Total - Third Quarter	2,884	2,993	2,937		3.8	-1.9	
July	931	953	936		2.4	-1.8	
August	959	990	920		3.2	-7.1	
September	932	934	886		0.2	-5.1	
Total - Fourth Quarter	2,822	2,877	2,742		1.9	-4.7	
Fiscal Year	11,220	11,696	11,518	5,539[2]	4.2	-1.5[3]	-5.1[4]

[1] Admissions for April 1984 through March 1985 are projected to account for processing lags.
[2] Year-to-date total.
[3] About 1.8 percent decrease if adjusted for Leap Year.
[4] About 4.6 percent decrease if adjusted for Leap Year.

NOTE: We are unable to estimate admissions for the month of April 1985 because of a change in the process of reporting admissions for four contractors involving five States.

Source: Admission notices from Query/Reply System processed in BDMS through April 1985.

Turning to Table 2, which has more detail, it appears that the decline is accelerating. For the fourth quarter of fiscal year 1984 and the first two quarters of fiscal year 1985, the declines in admissions were 4.7, 3.8, and 6.4 percent, respectively. Compared to the trend up to fiscal year 1983, the annualized rate of change experienced during the last quarter differs by about 10 percentage points.

The decline in admissions to date clearly shows that the fears of some concerning possible incentives to increase admissions have not been borne out. Instead of an acceleration in the rate of growth of admissions, an unprecedented decline in admissions has been experienced. Indeed, this raises a more difficult question to answer: has PPS been a factor in the decline in admissions?

Role of PPS

Isolating the role of PPS in the admissions decline is made difficult by the fact that the beginning of PPS occurred at the same time as other factors that have had substantial influence over the health care system. For example, employment-based health plans have increased the use of deductibles and coinsurance for both inpatient and outpatient services and expanded the degree of review of claims. Technological change has increased opportunities to substitute outpatient for inpatient care.

Indeed, admissions among the under-65 population have also been falling. According to the American Hospital Association's National Hospital Panel Survey, admissions for those under age 65 began to decline in late 1981, and the decline accelerated in early 1983 and has continued to date. In fact, for the first four months of calendar

year 1985, admissions for persons under age 65 were 6.1 percent lower than the comparable period in 1984. Since PPS is unlikely to have caused the decline in the under-65 population, it need not be the prime factor behind the decline for the 65-and-over population.

We pursued two approaches to attempt to isolate the role of PPS in the decline of admissions. First, we compared the experience of those hospitals in the four States not participating in PPS at the time—the waiver States—with the rest of hospitals (see Table 3). Between 1983 and 1984, waiver State admissions decreased by 0.6 percent, but non-waiver State admissions decreased by 4.1 percent. This large difference did not follow patterns for the previous period (1982 to 1983), where admissions in waiver States increased by 2.6 percent and admissions in non-waiver States increased by 2.2 percent. This contrast implies that PPS played a role in the decline on admissions.

TABLE 3

PERCENT CHANGE IN MEDICARE DISCHARGES IN WAIVER STATES AND NON-WAIVER STATES

Period[a]	Waiver	Non-Waiver	Total
1982-1983	2.64	2.24	2.31
1983-1984	-0.57	-4.14	-3.52

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[a] Fiscal Years

Source: HCFA, Bureau of Data Management and Strategy

An important caveat to bear in mind is that, with only four waiver States, policy changes in those States may have played a role. However, the one policy change that comes to mind—the use of total hospital revenue caps in Massachusetts—would be expected to reduce the magnitude of differences in declines in admissions rates. The second approach to isolating the impact of PPS is based on the fact that all hospitals did not start PPS on the same date. To attempt to separate out the impact of PPS from other factors influencing admissions, we estimated a regression model with data from individual hospitals. The data base (described in detail in Carter and Ginsburg (1985)) consisted of quarterly observations from a panel of 685 hospitals in nonwaiver States that reported complete discharge abstract data to the Commission on Professional and Hospital Activities from 1981 through 1984. The dependent variable was the percent change in Medicare admissions from the corresponding quarter in the previous year. Independent variables included region, hospital size, teaching status, urban/rural location, and ownership. In addition, three dummy variables were entered that indicated, respectively whether, (1) the observation was in fiscal year 1984 or fiscal year 1985, (2) the observation was in the third or fourth quarter of calendar year 1984 (to reflect PRO activity), and (3) the hospital was on PPS in the quarter. The results are presented in Table 4.

Table 4

REGRESSION OF PERCENT CHANGE MEDICARE DISCHARGES FOR YEAR-AGO QUARTER

Variable	Coefficient	Standard Error	Significance Level
On PPS during quarter	-1.0	0.6	0.07
October 1983-December 1984	-4.5	0.4	0.0001
July 1984-December 1984	-4.6	0.5	0.0001

SOURCE: Professional Activities Study

NOTE: Regression also includes independent variables for census division, ownership, bed-size, teaching status, urban/rural location, and an intercept. These results are available from the authors. Each observation was weighted by the number of discharges in that hospital in that quarter.

The interpretation of the table is that, all else being equal, hospitals on PPS had a 1.0 percentage point lower increase in Medicare admissions than hospitals not yet on PPS.

While this regression model shows clearly the abrupt change in admission patterns that began in fiscal year 1984 and accelerated during the last quarter of that year, the results on the effects of PPS are somewhat ambiguous. The PPS variable, which reflects the timing of hospitals' entry into the program, indicates that PPS was associated with a one percentage point reduction in the rate of change in admissions. One can reject the null hypothesis of no effect of PPS on admissions only at the 7 percent level, but one can be considerably more confident that there was not a substantial positive effect; for example, one can reject the hypothesis that the true effect of PPS was a 1.0 percent increase in admissions at less than a 1 percent level.

These estimates of the effect of PPS could, however, underestimate the true effect. Recall that the estimate is based entirely on the timing of hospitals' entry into the program. If there were lags in admission changes in response to the program or those hospitals entering the program last put changes into effect prior to their entry, the model would not detect all of the changes associated with PPS.

A potentially important result is the large coefficient for the dummy variable for the July 1984-December 1984 period. It indicates a 4-5 percentage point acceleration in the admission decline, above and beyond the decline associated with the October 1983-December 1984 period.

Some of this acceleration could be associated with the commencement of PRO activity, but more detailed data are required before firm conclusions can be drawn. While PRO activities began in July 1984, start-up delays meant that some of the PROs were not active until a few months later. Also, other developments might have played a role, such as openings of additional free-standing surgical centers or emergency centers.

OUTPATIENT SUBSTITUTION

Additional insight into the experience with admission rates under PPS is obtained by focusing on DRGs where opportunities for substituting outpatient services are important. Such an analysis was conducted as part of the Rand Corporation's study of the increase in the Case Mix Index (CMI) that was prepared for HCFA (Carter and Ginsburg, 1985).

The CMI study identified a group of 37 DRGs where outpatient substitution was potentially important, and compared trends in admissions in these DRGs with those in the remainder of the DRG categories. For each of the remaining DRGs, a regression was estimated where the dependent variable was the proportion of discharges in that DRG, and the independent variables were a quarterly time trend and a dummy variable for fiscal year 1984 (the period covered by the data base when PPS was in effect). These regressions decompose the changes in the proportion of discharges into a pre-PPS trend and a PPS effect.

Table 5 includes the regression coefficients for the 37 DRGs (those for the remainder are included in the appendix of Carter and Ginsburg, 1985). Of the 37, 9 had coefficients for the PPS dummy that were statistically significant at the 5-percent level. Of these, five were negative, indicating a possible shift out of the hospital relative to the pre-PPS trend. Overall, 23 of the 37 coefficients had negative signs. Summing all 37 PPS coefficients yields an aggregate decline in the proportion of discharges in these 37 DRGs of 0.6 percentage points.

Table 5

CHANGES IN PERCENTAGE OF TOTAL MEDICARE DISCHARGES IN 37 DRGs WITH POTENTIAL FOR OUTPATIENT SUBSTITUTION

DRG		Pre-PPS Trend	PPS Shift
6	Carpal tunnel release	-0.0080	-0.0302*
39	Lens procedures	0.1911*	-0.6333*
40	Extraocular procedures, except orbit age 18	-0.0215*	-0.0038
53	Sinus and mastoid procedures, age 18	-0.0023	0.0144*
55	Misc. ear, nose and throat procedures	-0.0050	0.0014
61	Myringotomy age 18	-0.0004	-0.0017
161	Inguinal and femoral hernia procedures, age 70 and/or C.C.	-0.0189*	0.0536*
162	Inguinal and femoral hernia procedures, age 18-69 w/o C.C.	-0.0323*	0.0022
187	Dental extractions and restorations	-0.0097*	0.0061
221	Knee procedures, age 70 and/or C.C.	0.0138*	-0.0068
222	Knee procedures, age 70 w/o C.C.	0.0067	-0.0161
225	Foot procedures	0.0058	-0.0134
228	Ganglion (hand) procedures	-0.0045*	0.0019
229	Hand procedures except ganglion	-0.0051	-0.0195
232	Arthroscopy	0.0000	-0.0072*
261	Breast procedures for nonmalignancy except biopsy and local excision	-0.0011	-0.0001
262	Breast biopsy and local excision for nonmalignancy	-0.0150*	0.0085*
266	Skingrafts except for skin ulcer or cellulitis w/o C.C.	-0.0074*	-0.0091
267	Perianal and pilonidal procedures	-0.0005	0.0011
268	Skin, subcutaneous, tissue and breast plastic procedures	-0.0027	-0.0034
270	Other skin, subcutaneous tissue, and breast O.R. procedures age 70 w/o C.C.	-0.0150*	-0.0049
310	Transurethral proc., age 70 and/or C.C	-0.0094	0.0414*
311	Transurethral proc., age 70 w/o C.C.	-0.0103*	-0.0059
320	Kidney and urinary tract infections, age 70 and/or C.C.	0.0564*	-0.0390
321	Kidney and urinary tract infections age 18-69 w/o C.C.	-0.0200*	-0.0198
322	Kidney & urinary tract infections, age 0-17	-0.0002	0.0003
328	Urethral stricture, age 70 and/or C.C.	-0.0121*	-0.0034

* Coefficient statistically different from 0 at the 0.05 percent level.

additional patients. Whenever hospitals are above the level of output that they have staffed for, they are not likely to want to tax further their human resource factors that are fixed.

While a more complete specification of costs helps explain persistent low occupancy rates, it nevertheless does not explain the decline in admissions associated with PPS. For example, most hospitals are likely to have been placed in a position of short-run disequilibrium by the decline in volume of non-Medicare admissions that began before PPS. This should have led them to attempt to increase their volume of Medicare admissions, since marginal costs are likely to have been low.3/

The absence of an increase in Medicare admissions leads one to question hospitals' ability to influence the volume of Medicare admissions. Recall that, under Medicare, hospitals cannot vary price to attract more patients. The patient pays the same cost sharing no matter which hospital is used. A hospital can increase its volume of Medicare patients only by inducing physicians to admit more patients or by increasing amenity levels or aspects of quality that patients can recognize. But for the hospital system as a whole, the volume of Medicare patients can increase only if physicians admit patients at a higher rate. Hospitals may have little ability to influence whether a patient is admitted to a hospital at all, as opposed to whether the patient is admitted to hospital A or hospital B, where marketing may be quite

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3/ Another factor, though probably less important, is the decline in unit costs accomplished by the hospitals in response to PPS incentives. If unit costs declined faster than unit revenues, the model would predict a higher optimal output. Whether unit costs have in fact declined more rapidly than unit reimbursements is not known.

important. How physicians feel about admitting Medicare patients to the hospital is discussed below.

In conclusion, while a broader accounting of the costs of operating at various volume levels leads one to question the strength of economic incentives on the part of the hospital to increase the volume of Medicare patients, incentives during fiscal years 1984 and 1985 were nevertheless in the direction of an increase in volume. The sharp decline that was experienced leads one to downplay the abilities of the hospital system (as opposed to individual hospitals) to affect the volume of admissions, at least relative to the role of physician incentives, technological change, and other factors.

EMPIRICAL COST FUNCTION LITERATURE

An extensive literature on empirical research is available to assess the magnitude of hospital economic incentives to increase the volume of admissions. As shown in this review of the literature, early studies indicated that marginal costs (MC) are chronically below average costs (AC), implying that the typical hospital could increase profits by admitting more patients. The most recent studies estimate a ratio of MC to AC closer to 1.0, implying much smaller incentives to increase admissions.4/

4/ The non-technical reader may wish to proceed to the next subsection—on other incentives.

Early Studies

The earliest hospital cost studies focused on the issue of the optimal size of hospitals. A great deal of energy was going into health planning at that time, and economists sought to guide planners on this dimension of their decisions. Most of the early studies found moderate economies of scale, up to a fairly large bed size (P. Feldstein, 1961; Carr and P. Feldstein, 1967; Ingbar and Taylor, 1968). Some attention was also given to the issue of the ratio of short-run marginal costs to average costs, with results tending to indicate ratios well below 1.0. These results implied that the average hospital tended to operate with too low a patient census, and thus had incentives to admit additional patients.

More sophisticated methods soon cast doubt on the presence of economies of scale (see discussion in Cowing, Holtmann, and Powers, 1983). The early studies had two prominent problems. First, considering stochastic demand and limited tools by hospitals to influence the volume of admissions in the short run (for example, most patients not being affected by price as a result of extensive insurance), hospitals are not likely to be operating on their long-run average cost curve very often. Recall that the long-run average cost curve is an envelope of segments of short-run average cost curves at various levels of capacity. With hospitals operating on other segments of short-run average cost functions most of the time (due to stochastic demand), estimation of long-run average costs from cross-section data in this manner will be subject to considerable error.

The second problem concerns the econometric specification used. Regression models typically included both a variable for beds and one for output (patient days or admissions). But estimating economies of scale by varying beds and holding output constant is not consistent with the derivation of long-run average costs from economic theory.

More recent studies, which deal with these and other problems, "have found little evidence of significant scale effects, beyond rather small hospital size, an indication that these early studies were indeed flawed by substantial specification error" (Cowing, Holtmann, and Powers, 1983, p. 264).

Influential studies, however, continued to confirm the relationship between short-run marginal and average costs. Specifically, studies by Lave and Lave (1970a and 1970b), M. Feldstein (1968), and P. Feldstein (1961) estimated the ratio of MC to AC to range from 0.21 to 0.68. The smaller MC/AC ratios were associated with shorter time units of observation: P. Feldstein, using monthly cost data, estimated ratios of 0.21 to 0.27. In contrast, Lave and Lave estimated ratios from 0.40 to 0.65 using semi-annual data, but 0.58 to 0.68 using annual data.

Lipscomb, Raskin and Eichenholz (1978) surveyed the literature on hospital cost functions published through 1975 and listed the MC/AC ratios from 20 studies. The ratios varied greatly, depending on output measure and the interval of observation. Those with short intervals had MC/AC ratios ranging from 0.22 to 0.74, while those with longer intervals (usually one year) had ratios ranging from 0.58 to in excess of unity.

The results in the survey were sensitive to the output measure used. Those studies using patient days had MC/AC ratios ranging from 0.22 to 0.34, whereas those using admissions had ratios from 0.55 to 0.74. The sensitivity of MC/AC to output measure was further confirmed by Lave and Lave (1978), who found that MC/AC using patient days generally was considerably less than the corresponding MC/AC using admissions as output. This difference reflects the distinction between the cost of extending stays versus the cost of additional admissions. Only the latter are relevant to the issue of volume adjusters under PPS.

These results, indicating that MC is less than AC in the short run, imply that most hospitals are operating below the optimal rate and thus have incentives to increase admissions. More recent research, however, has pointed out problems in much of the early work on this topic, casting doubts on the applicability of these results. Some of this recent research is purely theoretical, using economic theory to identify problems in the models underlying the studies, while other recent research is empirical, testing new models of hospital cost behavior. Three issues are especially important to relationship of short-run MC and AC[5/] and are discussed here: the role of physicians in providing hospital care, the multiproduct dimension of hospital care and the role of uncertainty (for a detailed review of these and other issues see Cowing, Holtmann and Powers, 1983).

[5/] Since economies of scale appear not to be important in hospital care (though economies of scope may be), this report on PPS issues focuses its analysis on short-run costs.

The Role of Physicians

The role of physicians in the provision of hospital care was neglected in cost studies until the late 1970s. Physicians represent a very special kind of input into the production of hospital services, because they not only admit patients, but also influence how resources are allocated within the hospital. For the most part, however, they are not employed by the hospital where they work and as a result data on hospital costs do not include the cost of this very important input.

Omitting this input introduces specification error and raises questions about the reliability of the results obtained. These concerns are substantiated by more recent studies (Baron, 1978; Pauly, 1978; Bays, 1980) that have attempted to include some measure of physician services in the estimated cost models and have obtained results which contradict those of earlier studies (Cowing, Holtmann, and Powers, 1983). Pauly, for example, found that a higher ratio of admitting physicians per patient tends to increase costs. The relationship of such specification error to estimates of the ratio of MC to AC has not yet been established, however.

Multi-Product Cost Functions

Estimating cost functions using a one-dimensional output measure, such as patient days or admissions, creates problems because it implicitly assumes the aggregation condition (i.e., constant marginal cost) necessary to make this a valid approach is fulfilled. As will be discussed below, recent empirical studies have shown the theoretical requirements for aggregation of hospital services to be violated.

Furthermore, using a one-dimensional output measure neglects economies of scale associated with specialization. Defining scale economies, which for one output is very simple, becomes difficult when joint production is involved, and the MC/AC ratio, which has an easy interpretation for one output, loses its meaning when there are several outputs.[6]

The importance of the multi-product nature of hospital services was recognized early by researchers who nonetheless have had considerable difficulties trying to deal with it. Most of the studies performed in the early 1970s chose to include some measure of case-mix, which along with other explanatory variables was related to total hospital costs (Berry, 1967; Lave and Lave, 1970; Evans, 1971; Evans and Walker, 1972; Lave, Lave, and Silverman, 1972; and Lee and Wallace, 1973). A few studies chose to determine the disaggregated cost of providing individual services (Hu, 1971, and Baron, 1978). Later studies used a single-scale index of hospital output based on aggregated hospital services (Pauly, 1978; Baron, 1974; Hellinger, 1975; and Jenkins, 1980).

Although many of the early studies using case-mix variables exhibited great ingenuity in developing the techniques used to derive the case-mix measures, they bore no formal (theoretical) relationship to multi-product cost functions. This lack of clear relationship to formal multi-product cost structures makes it difficult to evaluate, much less compare, the results of these studies (Cowing, Holtmann, and Powers, 1983).

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[6] Economies of scale and a generalization of the MC/AC ratio still retain their meaning along a "ray," i.e., where outputs are produced in fixed proportions.

Uncertainty Concerning Admissions Rates

Regardless of whether physicians are able to increase admissions, neither they nor the hospitals can ever predict with complete accuracy the level of future admission rates. As a result, hospitals face an inherent uncertainty when planning the future provision of services. This issue of uncertainty facing hospitals has been largely neglected in the literature until recently, but is of major importance to the issue of the ratio of short run MC to AC.

Given that many of the costs incurred by hospitals are "quasi-fixed," i.e., fixed for a specific time period such as a year, hospitals must plan based on expected levels of demand. The cost implications of changes in volume that are expected and those that are not are likely to be dramatically different.

Most studies estimating hospital cost functions, however, have neglected to incorporate the role of uncertainty. At best, uncertainty is incorporated in some informal manner (Lave and Lave, 1970; Joseph and Folland, 1972; and Joskow, 1980); at worst, it is completely neglected except for a comment or two about the existence of uncertainty and that it probably accounts for some of the observed excess capacity (Cowing, Holtmann, and Powers, 1983).

One way to illustrate the consequences of the omission of the role of uncertainty is to model hospitals as providers of not only direct, anticipated patient care, but also of standby capacity to meet unexpected surges in demand for hospital care. Put differently, the hospital provides direct services as well as insurance or option

demand for such services. But option demand is just another service and excluding it from the estimated model results in specification error. Consequently, the estimated coefficients will be biased (Cowing, Holtmann, and Powers, 1983).

Another way to illustrate the consequences of uncertainty is to compare estimated cost functions under both stochastic and certain demand conditions. Assuming that hospitals under perfect certainty choose output levels equal to the expected output level of the probability distribution of outputs under uncertainty, it can be shown that the expected cost to hospitals facing stochastic demand is greater than the costs for similar hospitals facing the same average demand with certainty. As mentioned above, this means that failure to take into account stochastic demand results in specification error and biased coefficients (Cowing, Holtmann and Powers, 1983).

A study by Friedman and Pauly (1981, 1983), which was funded by the Health Care Financing Administration, has dealt directly with the issue of uncertainty and incorporated it into an estimated cost function by specifying a model in which cost is a function of both planned (expected) admissions and actual (observed) admissions. The argument is as follows: Hospitals, because they face stochastic demand, must plan based on an expected level of admissions (or, equivalently, an expected rate of occupancy) and a fixed level of quality of services provided. If demand then increases unexpectedly so that actual occupancy exceeds the planned rate, quality will be allowed to deteriorate to accommodate this unexpected increase in demand for hospital services. Expected hospital services can be seen as the product of the (actual) quantity and the quality of services provided. If the actual quantity exceeds

that estimated, quality must deteriorate. This deterioration of quality may be tolerated for a short period of time without adverse consequences for the hospital, but if it is sustained for a longer period of time, it will—in all likelihood—have some kind of adverse (economic) consequences such as reduced demand, shortage of employees, etc. Friedman and Pauly call this phenomenon latent penalties.

These latent penalties, which have the potential to become very costly for the hospital if the anticipated level of admission is very inaccurate (e.g., if the hospital's maximum capacity is much less than that needed to handle certain levels of admission), can be reduced in the short run by operating with what may seem like excess capacity. This excess capacity serves to keep the level of quality of services (more or less) constant in times of unexpectedly high demand. If an increase in demand turns out to be permanent rather than temporary, expectations about future levels will be adjusted accordingly and future planning will be based on new higher levels of expected admissions.

The implication of this model is that hospitals' short-run cost curves shift over time in response to permanent changes in expected demand. For estimation purposes, this means that when one compares hospitals cross-sectionally, one is comparing hospitals with different levels of short-run costs, the consequence of which is that the estimated MC of an admission is much higher when based on cross-sectional data than when based on time-series data from just one hospital. Consequently, this explains some the observed discrepancy between estimates of MC/AC ratios based on cross-sectional and time-series data. Friedman and Pauly take the

distinction between planned and actual occupancy rates into their model specification and find that, for expected admissions, short-run marginal costs are approximately equal to average costs.

The results imply that only hospitals whose volume of admissions is below the planned level have strong incentives to increase admissions. When volume is above the planned level, the hospital would actually prefer a reduction to that level. An increase in the planned level would involve an increase in costs comparable to the increase in revenue (assuming revenue is close to average costs). The Friedman and Pauly results may help us understand the current phenomenon of some hospitals operating at very low occupancy rates—in some cases less than 50 percent—without incurring losses.

Summary

This section has been concerned primarily with short-run cost functions, specifically the relationship of MC to AC. Early empirical studies, despite a wide range of estimated results, have given rise to the widely accepted proposition that short-run MC equals 0.4 AC or 0.5 AC. These studies, however, all suffer from specification errors of one kind or another. The recent work of Friedman and Pauly suggests that MC of an expected admission is very close to AC, and that situations where MC is much lower than AC occur only as a result of changes in admissions moving the hospital towards the planned level.

OTHER INCENTIVES

Other incentives are likely play a role in determining the volume of admissions under PPS. They include hospital incentives associated with Medicare policies concerning reimbursement of services provided by hospital outpatient departments, patient incentives, and physician incentives.

Outpatient Reimbursement Policies

For those patients who can be treated as either outpatients or inpatients, outpatient reimbursement rates are relevant to the hospital's incentives. In many cases, the alternative to hospitalization is treatment in the hospital's own outpatient department. For example, if a patient is to have an ophthalmologist on the hospital's staff perform cataract surgery, the physician might find little difference between hospitalizing the patient or performing the surgery in the hospital's outpatient surgery unit.

For the average surgical patient who can be treated on an outpatient basis, it may be financially advantageous to the hospital to use the outpatient setting. Reimbursement for services provided by the hospital (operating room, lab tests, X-rays) could be higher in the outpatient department. First, inpatient reimbursements have been sharply constrained since 1983 as a result of provisions of the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA), and are likely to be tightened further in the next few years. In contrast, reimbursement for services in hospital

outpatient departments have remained on a cost reimbursement basis, and no caps or ceilings have been applied. Second, past inpatient reimbursement constraints have given hospitals incentives to shift overhead expenses to the outpatient department, and today's different reimbursement modes lead to very strong incentives for this.[7] For these reasons, reimbursement could be substantially higher for outpatient services. Recently, Senator Durenberger released information indicating that such a reimbursement incentive is in place for cataract surgery and introduced legislation (S.1489) to limit reimbursements for outpatient services to payments for inpatient services under PPS.

While shifting patients to the outpatient setting might leave beds empty, the financial implications of this to the hospital may be negligible. Note the results from Friedman and Pauly (1981,1983) that for expected admissions, the short-run marginal costs are close to average costs. Thus, if the hospital plans on a lower level of demand on its hotel services and nursing staff, it can probably reduce its costs almost proportionally, and not being reimbursed for such services not being provided—and not expected to be provided—is not much of a problem. Thus, hospitals could come out ahead even if the outpatient reimbursement is somewhat less than the inpatient reimbursement, since costs will be lower.

Patient Incentives

In contrast to the incentives facing many privately insured patients, which often favor hospitalization, incentives in the Medicare benefit structure now often favor

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[7] An offsetting incentive is that for private patients outpatient services have a more elastic demand as a result of less extensive insurance coverage.

outpatient treatment. For inpatient services, Medicare patients pay a deductible equal to $400 in 1985 (scheduled to rise to $492 in 1986). For outpatient services, the annual deductible will usually have been met anyway through charges for physicians' services, so the relevant cost sharing is the 20-percent coinsurance. Outpatient care would cost the patient less as long as the outpatient department's bill (exclusive of charges for physician services) is less than $2,000 ($2,465 in 1986). But for approximately 150 procedures on a list of those judged suitable for ambulatory surgical centers, Medicare waives the coinsurance for services delivered either in surgical centers or hospital outpatient departments when assignment is accepted. In these instances, patient incentives clearly favor the outpatient setting.

"Medigap" insurance (private insurance policies that supplement Medicare), which tends to cover both the hospital deductible and Part B coinsurance, and Medicaid coverage eliminate many of the patient financial incentives to use one setting or the other for roughly 70 percent of patients. Thus, few Medicare patients are likely to have a strong financial incentive to prefer either an inpatient or outpatient setting, but those that do are likely to have incentives favoring outpatient settings. With patient economic incentives so slight, noneconomic factors, such as the availability of friends and relatives to assist in recuperation, are likely to dominate.

Physician Incentives

Economic incentives facing physicians have tended to favor hospitalization, but other incentives may have greater importance. Physicians tend to be reimbursed

more for their services when performed in an inpatient setting. Medicare carriers often have separate screens for inpatient versus outpatient visits. The inpatient screens tend to be higher, because inpatient physicians' services have historically tended to be more fully insured (and thus charges have been higher). But screens for procedures tend not to be separate, so that a surgeon is unlikely to be paid more for a specific procedure in an inpatient setting.

On the other hand, physicians today face a much more constrained environment in the inpatient department than the outpatient department. They are likely to have to document the need for the admission to the PRO in advance. If the patient is then admitted, the physician may then face pressure from the hospital to keep resource costs within the limits implied by DRG-based payment. These factors may outweigh the economic incentives outlined above.

On balance, economic theory and econometric analysis suggest that hospitals can operate efficiently well below their capacity. This, however, does not explain recent declines in admissions. Rather, it indicates that the advantages for a hospital in increasing admissions are limited, and may be overwhelmed by the advantages to physicians and patients of outpatient settings.

IV. VOLUME ADJUSTERS IN STATE RATE-SETTING PROGRAMS

Presumably influenced by the early cost function literature, most State rate-setting programs have made use of volume adjusters. In the following section, the provisions relating to volume of six statewide hospital rate-setting programs are described. Then, the rationale behind the use of adjusters is discussed, and the literature on the effects of volume adjusters reviewed.

STATE POLICIES

The six states—Connecticut, Maryland, New Jersey, Massachusetts, New York, and Washington—have widely varying systems and correspondingly varying approaches to volume adjustments.

Connecticut

Connecticut's hospital rate-setting program, administered by the Commission on Hospital and Health Care, dates back to 1974. Since then, the program has undergone substantial changes and is currently in the midst of a transition to a DRG-based system which is scheduled to take effect in 1986 (Heck, 1985).

The program started out as a budget review process whereby each hospital submitted for approval a net patient revenue budget. This budget was then subjected to a test of reasonableness, which, if passed, allowed the hospital to set its own charges, the only constraint being that total patient revenue derived from charges not exceed the total level approved. If the overall test of reasonableness was not passed, the hospital's budget would then be subjected to detailed review of

costs and volume of services on the departmental level. In this review, interhospital comparisons were used to screen for excess costs (110 percent of median for group being a typical criterion), and volume adjustments were made under the assumption of 50 percent fixed cost and 50 percent variable cost. After appropriate disallowances and adjustments, a revised net patient revenue budget would be approved (Coelen and Sullivan (1981) and Crozier (1982)).

The system described above remained in force with minor changes until 1984. Under the current system, the Commission sets gross inpatient service revenue (GISR) for each hospital. GISR is calculated by adding:

1) allowable inpatient operating cost,
2) approved capital costs,
3) approved direct medical education cost,
4) any approved gross subsidization, and
5) miscellaneous approved cost.

Allowable inpatient operating cost is determined by the Commission, taking into consideration the budgeted increase in admissions as well as increases or decreases in the volume of services. Hospitals then establish their own charges such that GISR at the budgeted volume of service does not exceed the level of GISR approved by the Commission. Two months before the end of the fiscal year, the allowable GISR is recomputed, based on actual rather than budgeted volume (9 months actual and 3 months projected). Adjustments to the following year's allowable revenue will be made if actual admissions were greater than 101.5 percent or less than 98.5 percent

of budgeted admissions. The Commission uses a variable cost factor of 50 percent in making such adjustments (personal communication, Commission staff).

Commencing in 1986, hospitals will have to set charges according to fee schedules based on a fixed charge per case for all inpatient cases not classified as outliers. The Commission will determine the fee schedules of which where will be three, one for each of the following payers: Medicaid, other medical assistance provided pursuant to chapters 302 and 308, and other third-party payers. Otherwise, the system will remain unchanged. In short, the new Connecticut rate-setting system will include the approval of GISR, fixed charges per case, and volume adjustments according to a 50 percent variable factor, if admissions deviate by more than 1.5 percent from that budgeted.

Maryland

Maryland's rate-setting program dates back to 1974 and, in 1977, it was expanded to include all payers. An independent commission, Maryland's Health Services Cost Review Commission (HSCRC) limits patient revenue through rate approval for charges to all payers. The approach to regulation of hospitals taken by the Commission is a so-called quasi-utilities approach, whereby rates are estimated so that revenues equal cost to a first approximation.

Rates are set based on projected volume and adjusted for inflation and pass-through costs. Deviations from projected volume of admissions are reimbursed using a 50 percent variable cost adjustment factor. In contrast to Connecticut, no corridor is

used—all deviations from projected volume—either up or down—are subject to a 50 percent volume adjuster.

HSCRC also performs detailed rate reviews of budgets of hospitals believed to have excessive costs. Two screens are used to determine excessive cost: an interhospital comparison of cost in the relevant hospital group, and a yearly comparison of the hospital's direct cost with the prior year's approved or actual cost (Coelen and Sullivan (1981)).

Finally, HSCRC operates a Guaranteed Inpatient Revenue (GIR) system whereby an amount calculated based on the hospital's own case mix and average charges by diagnosis is guaranteed the hospital regardless of its revenues. If total revenues are below GIR, the hospital is then rewarded, whereas it is penalized when total revenues are highter (Worthington and Piro, 1982).

Massachusetts

Massachusetts' hospital payment law of 1982 authorizes the State rate-setting commission to place prospectively determined caps on hospital patient-care revenues from the four major payers: Blue Cross, charge payers, Medicare, and Medicaid (Massachusetts Rate Setting Commission, 1984).

The Commission determines for each hospital an allowed budget and the share of that budget that is the responsibility of each payer. Payments are based on allowed costs, rather than actual costs, placing the hospital at risk for cost overruns. If,

however, the hospital holds its expenditures below the level of allowed cost, it keeps the difference.

To establish allowed patient care costs in a year, a hospital's base year costs, adjusted by an inflation index, are further adjusted for volume changes, which are treated asymmetrically. If admissions increase, the hospital's budget for inpatient costs is increased by half of that percentage—a 50 percent volume adjuster. However, on the down side, there is a corridor. For declines in admissions up to 7 percent, the budget is not reduced at all. This provides a substantial incentive for the hospital to reduce admissions.

New Jersey

New Jersey's rate setting program began as a prospective determination of (all-inclusive) per diem rates based on expected total revenue (Glaser, 1984). In 1980, the system was changed into one in which hospitals are reimbursed on a per admission basis. Diagnosis Related Groups (DRGs) were established to recognize case-mix differences in admissions. The New Jersey Department of Health calculates pay rates for each DRG using hospital-specific as well as statewide costs (Coelen and Sullivan, 1981).

Under the New Jersey DRG program, each hospital is issued a schedule of DRG-based payment rates. These rates are part of an overall system which calculates for each hospital an allowable or reasonable total revenue target for the coming rate year. The estimated revenue target for each hospital is based on the hospital's

historical cost structure and on the assumptions that neither volume nor case-mix will change relative to the base year. In order to provide for instances where volume or case-mix do change, the New Jersey program uses a formula based on the notion of fixed and variable costs to adjust target revenue levels for changes in volume or case-mix. The fixed and variable cost percentages are calculated separately for each hospital using the cost classification scheme presented in Table 6. The determination of how much of the compensation related costs will be considered fixed is a function of the size of the change in the hospital's volume and/or case-mix. For large changes in volume or case-mix, all costs are considered variable; for small changes in volume/case-mix the supply related costs are 100-percent variable while for compensation costs the variable percentages are less than 100 percent. In addition to the size of the change, the New Jersey approach also considers whether volume has increased or decreased in determining the appropriate adjustment to the approved revenue levels. The policies covering these issues are summarized in Table 7. As Table 7 indicates, for changes in volume/case-mix exceeding 3.3 percent in a year, the hospital's costs (and thus allowable revenues) are considered to be 100 percent variable.[1/] For changes below 3.3 percent in a

Table 6

CLASSIFICATION OF COSTS IN NEW JERSEY

Cost Category	Cost Elements Included	Treatment	Approximate Percentages
Supply related	Supplies, contracted services, other expenses, depreciation, lease costs, physician salaries	100% variable	40%
Compensation related	Wages and salaries	Semi-variable (semi-fixed)	60%

[1/] In these cases the hospital keeps all the revenue associated with an increase or, alternatively, forfeits all the revenue associated with a reduction in volume/case-mix.

year, a hospital's approved revenue will change by less than 3.3 percent, with the exact level depending on the hospital's cost structure and the magnitude of the volume/case-mix change.[2]

Table 7

SUMMARY OF VOLUME/CASE-MIX ADJUSTER POLICIES IN NEW JERSEY

Size of Volume/ Case-Mix Change (annual)	Direction of Change	Cost Category	Treatment/Policy
Above 3.3%	Increase or decrease	Supply	100% variable
		Compensation	100% variable
From 0.0% to 3.3%	Increase or decrease	Supply	100% variable.
		Compensation	The percentage considered fixed declines as size of change nears 3.3%.

New York

New York has one of the oldest and most extensive rate-setting programs in the United States. Prospective per diem rates are calculated based on base year (2 years earlier) actual cost, which is limited to the average cost for similar hospitals. This adjusted cost figure is then trended forward to reflect inflation. The per diem rate is finally obtained by dividing this total projected cost by the number of patient days in the base year.

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[2] The implication of this policy is that for small changes in volume/case-mix the hospital's revenue is only slightly affected.

The per diem rates are calculated to ensure that fixed costs will be reimbursed. Increases in volume over base year volume, however, will be adjusted by an appropriate fixed cost factor. Adjustments are made for changes in length of stay (patient days) and discharges according to the following schedule of fixed variable cost proportion.

CHANGES IN LOS OR PATIENT DAYS

Range of Change	Fixed Cost %	Variable Cost %
0-5%	80	20
5-7	75	25
7-10	70	30
10	65	35

CHANGES IN DISCHARGES

Range of Change	Fixed Cost %	Variable Cost %
0-6%	60	40
6%	50	50

Finally, a hospital is penalized if its length of stay is above the group mean plus one half. The penalty is in the form of a disallowance consisting of "excess" days multiplied by the lower of the group's or the hospital's routine per diem (S. Finch, personal communication).

Washington

In the State of Washington, an independent commission approves the total patient revenue budget for individual hospitals 75 days before the start of the fiscal year. The commission also approves the budgeted volume, over which fixed cost is spread, and based on which the patient-day rates are calculated.

Deviation in revenue due to changes in volume is paid on basis of the following schedule:

Peer Group	Fixed Variable Cost %	Cost %
Small Size Hospitals Peer Group 1, 2	80	20
Medium Size Hospitals Peer Group 3, 4	70	30
Tertiary Hospitals Peer Group 5, 6	60	40

As mentioned above, payment is currently made on a per patient-day basis, but due to decreases in LOS, the Commission is considering payment on a per-adjusted admission basis. At this point in time, however, no changes have been made.

Rationale for Particular Volume Adjuster Schemes

Discovering the rationale behind particular volume adjuster schemes used by the States proved a difficult task. Literature on the subject is nonexistent and personal correspondence and interviews of members of the six States' rate-setting agencies provided only a hazy view of the underlying motivation. Commission members in most States did reveal a strong belief in the importance of volume adjusters to counteract apparent incentives to increase volume. While few of the people questioned were able to cite a specific study that formed the basis for their particular volume adjuster scheme, some were clearly familiar with the traditional literature on hospital cost functions, and referred to the ratio of MC to AC, which many studies have estimated to be approximately 0.4 to 0.6. The validity of this literature was called into question in the previous section of this report.

Impact of Volume Adjuster Schemes

The literature on the impact of State prospective rate-setting programs was reviewed in an attempt to find evidence about the impact of particular volume adjusters. Given the sparse literature on the overall impact of rate-setting programs, it is not surprising that no evidence concerning the effectiveness of individual volume adjuster schemes surfaced during this search.

Most of the studies of hospital rate-setting programs were done several years ago when many of the programs were quite different (Coelen and Sullivan, 1981; Melnick, 1981; Sloan, 1983; and Worthington and Piro, 1982). A few studies have attempted to determine the impact of rate setting on the volume of services. The results of these studies generally show length of stay to increase as a result of rate setting, but fail to detect an impact on admission rates. (Worthington and Piro, 1982; and Sloan, 1983.) No experience with DRGs is included in this literature. Since payment rates were based on hospitals' actual base period costs, the results are likely not to be relevant to PPS, where hospital-specific costs are employed only during a transition period.

Furthermore, basic studies of the impact of a program cannot isolate the effect of a particular volume adjuster scheme in use. For example, if New York's program has been more effective than, say, Connecticut's, one cannot infer that the difference is caused by differences in the volume adjuster.

V. POLICY OPTIONS FOR VOLUME ADJUSTERS

Should volume adjusters be added to Medicare's PPS? We see little advantage to them and some potential problems. In this section, we sketch briefly what a PPS volume adjuster might look like, and then discuss the likely effects.

Types of Volume Adjusters

While there are many specific variations that volume adjusters can take, the conceptual choices are very limited. PPS rates can be left unchanged with changes in a hospital's number of admissions (the present system) or can be changed in the opposite direction. The change in rates could be any proportion of the change in admissions. If the proportion were set to net to one, aggregate payments would not change with the volume of admissions. Any intermediate ratio—such as 50 percent—could be used. In general, the larger the change in the payment rates in response to a change in admissions, the stronger would be the incentive on hospitals to reduce admissions.

Volume adjusters in PPS would add a considerable—though not insurmountable—amount of administrative complexity. Hospitals would no longer know in advance Medicare's payment per case, since it would depend upon the volume of admissions during the current time period—possibly a reporting year. This would undermine PPS incentives. Intermediaries might have to make a retrospective adjustment to

each hospital's reimbursement—a return to the administrative practices used under cost reimbursement. Alternatively, an approach of adjusting next year's payment rate based on changes in volume experienced during the current year might be considered. This would ease the administrative complexity, but hospitals would still face uncertainty over their ultimate payment.

A difficult design issue is the base to work from. Volume adjusters deal with changes in a hospital's volume from a base period. Presumably, the incentive effects of volume adjusters could be realized only if the base were not updated on a regular basis. Otherwise, a hospital increasing admissions would be penalized once, but then could enjoy the "fruits" of the increase thereafter.

But developing an equitable base is very difficult. A hospital's volume of Medicare admissions varies a great deal from year to year—especially for small hospitals (data presented below). Thus, unless more than one year's data are used to establish a base, many hospitals would have a base where admissions were above or below a normal or planned level, and reimbursements will be affected by this for an indefinite period.

Using a weighted average of a number of years—with the most recent years weighted most heavily—can reduce the potential inequities from year-to-year variation. The price of such averaging is the use of old data to set a hospital's base. Some of the changes in hospitals' admissions over time will not be transitory, so that averages will cause other inequities.

These issues in developing a base period for volume adjusters were faced during the design of PPS. PPS's predecessor—the Medicare reimbursement provisions of the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA)—limited reimbursement per admission to a specific percentage increase from costs in hospitals' 1982 reporting periods. While some had proposed a prospective payment system where rates would be based on a hospital's actual costs during a base period, the Administration rejected such an approach as inequitable, and the Congress included a hospital-specific component for only a 3 year transition period.

Problems with Volume Adjusters

Problems with volume adjusters stem from the fact that they are designed for a very specific situation—transitory changes in a hospital's volume,3/ but interfere with permanent volume changes. They are designed for the situation where a hospital's admission volume is below the planned level, so that the marginal costs of an additional admission is much lower than the reimbursement for an additional patient. In this case, hospitals do have strong incentives to admit additional patients, and reducing such incentives might be desirable.

Even in this case, however, volume adjusters are unlikely to achieve a great deal. The social cost of admitting an additional patient to a hospital with a volume below what it had planned for is not large. While such a hospital would receive a windfall gain at the margin from a reimbursement approximating average costs, it would be

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3/ Large occupancy declines in sole community hospitals already qualify for special Medicare payments under Section 601 (d)(5)(c)(ii) of P.L. 98-21.

offset by windfall losses at the margin from hospitals with volume above the planning level.

But Medicare is unable to identify the unique situation for which volume adjusters are intended, since it is not privy to hospitals' plans. By varying payment rates on the basis of the change in hospitals' admission volume from a base period, the altered incentives are likely to influence other situations where a change in incentives is inappropriate. For example, a hospital may plan a volume increase to reflect growth in the area's population. Even if new beds are not constructed, the marginal cost of the increased volume is likely to be close to the reimbursement before any volume adjuster is applied. As discussed in more detail below, a hospital's base period from which volume adjusters are figured is unlikely to reflect a planned level of admissions. With hospital admissions being stochastic, it is likely to include an unplanned component, either positive or negative.

As a result of the inability to limit the application of volume adjusters to the special situation for which they were conceived, two categories of problems must be faced. One is the problem of distorted incentives to hospitals, and the other is the problem of inequities experienced by individual hospitals.

Incentives

If the marginal cost of a planned admission is close to the average cost, as the Friedman and Pauly results imply, then a volume adjuster based on an assumption of an MC/AC ratio of 0.5 would distort incentives. Hospitals with low costs would not be able to attempt to expand their market share because they would lose roughly 50

percent on every additional case, for example. High-cost hospitals in turn would have an expanded incentive to reduce their volume of admissions since the revenue from an additional patient would be greatly below marginal costs. Thus, one problem with PPS—the absence of a mechanism to lower costs through a movement of patients toward low-cost hospitals—could be exacerbated.

Possibly more serious is the fact that, on average, hospitals are being given incentives to reduce their provision of services to Medicare patients. Many have expressed concern about the effects of PPS on access to care by Medicare patients. Payment rates under PPS are being tightened and this risks situations where certain patients become identifiably unprofitable for hospitals. By employing a 50 percent volume adjuster, the incentive to turn away some Medicare patients is increased dramatically, as the marginal revenue is cut in half. For example, a hospital might find that a prospective patient's DRG reimbursement was 80 percent of marginal costs. With a 50 percent volume adjuster, reimbursement would fall to 40 percent of marginal costs, tripling the loss from admitting the patient.

Traditionally, analysts' concern has been that admission rates for those patients in the fee-for-service system have been too high, and have welcomed incentives to reduce admissions. But the incentive of reimbursing the hospital for the marginal patient at a rate that is dramatically less than marginal costs is not the best way to reduce admissions. There is little basis in this mechanism for ensuring that those not admitted would benefit least from inpatient services. Indeed, if hospitals admitted selectively and followed PPS incentives, some undesirable pattern of who is admitted and who is not would result. Utilization review and alternative delivery

systems have a better chance of focusing admission reductions on those patients with the lowest needs for hospitalization.

Equity

The degree to which a hospital's Medicare admissions vary from year to year makes it difficult to devise a volume adjuster system that is fair to individual hospitals. Table 8 shows the extent of normal year-to-year variation in Medicare caseload. The data are for changes from 1981 to 1982—a relatively "normal" period before the incentives of TEFRA or PPS were known. Ten percent of hospitals had declines in Medicare discharges in excess of 5 percent. Twenty-one percent had increases in excess of 10 percent.

Table 8

DISTRIBUTION OF PERCENT CHANGES IN MEDICARE DISCHARGES, 1981-1982, BY HOSPITAL

Percent Change in Discharges			Percent of Hospitals
-26.0	to	-10.0	5
- 9.9	to	- 5.0	5
- 4.9	to	0.0	15
0.1	to	5.0	28
5.1	to	10.0	25
10.1	to	20.0	17
20.1	to	79.3	4

SOURCE: PAS data for 717 hospitals in nonwaiver States

These problems are particularly acute for small hospitals. For example, while 5 percent of hospitals had declines of 10 percent or more, over 10 percent of hospitals with less than 100 beds had declines in this range.[4] While 4 percent of hospitals had increases greater than 20 percent, 8 percent of small hospitals had increases in this range.

Thus, it appears inevitable that a significant number of hospitals will find that their base for volume adjustment will be a year when Medicare discharges were unusually low or high. Medicare would then have to choose to ignore the inequities, and accept the consequences of financial harm to "unlucky" hospitals, or establish an administrative mechanism for mitigating such harm, as well as an appeals mechanism.

Hospitals in areas with rapid growth of Medicare enrollees would also be seriously impacted by a volume adjuster scheme. Area hospitals would have difficulty accommodating population growth under many volume adjuster schemes. An extensive appeals process would undoubtedly be required. This points up the conflict between a policy aimed at short-run behavior and the presence of long-term trends that the policy is not designed to deal with.

4/ Accordingly, continuing a special payment feature for sole community hospitals experiencing large volume declines may be appropriate.

Conclusion

Employing a volume adjuster in Medicare's PPS would not be a good policy, because it could undermine PPS incentives. In reviewing the theory of hospital costs and the empirical literature, we concluded that hospital incentives to increase the volume of admissions are not as strong as once thought. While most hospitals are likely to be below their planned levels of volume at the present time, once planned levels have adjusted to lower levels of demand, not all hospitals will find an additional patient to be economically advantageous because marginal cost could easily rise above average costs.

The recent experience calls into question hospitals' ability to pursue their economic incentives concerning the volume of Medicare admissions. Many hospital marketing tools may succeed in diverting patients from a competitor hospital, but may not affect the aggregate number of admissions over the hospital system. The incentives of physicians, utilization review by PROs, and technological change all appear to have been more powerful than hospital economic incentives in recent years.

To the extent that hospital economic incentives are of a smaller magnitude than previously thought, the incentives created by volume adjusters may do more harm than good. They pose serious risks of problems of access for some Medicare beneficiaries. Given the recent sharp declines in admission rates, which we do not yet fully understand, we need to be sensitive to inadvertent limitations of access.

Volume adjusters are likely to lead to serious inequities for individual hospitals because of the difficulty of establishing an appropriate base. Indeed, it is ironic that the phenomenon that volume adjusters appear to be in response to—transitory changes in the volume of admissions—makes establishing an equitable base so difficult.

Perhaps the most important argument against pursuing volume adjusters at the present time is that admissions have declined thus far under PPS. Given the risks and serious problems with volume adjusters, the apparent absence of the problem that they are designed to combat leads one to question the wisdom of introducing a general volume adjuster policy.

VI. PREADMISSION CERTIFICATION

The purpose of preadmission certification is to determine, prior to hospitalization, the medical necessity of elective admissions. Under Medicare and most other insurance plans incorporating this policy, preadmission review is conducted by a medical professional who either approves the admission or recommends outpatient treatment as an alternative. If conducted properly, preadmission certification can reduce expenditures while increasing quality by protecting the patient from unnecessary hospitalization. But because the policy is still relatively new, whether it succeeds on either dimension is still unknown. This section discusses the present status of preadmission certification in both the public and private sector and points out areas for consideration in future development of this Medicare policy.

Private Payers

Because preadmission certification is a relatively new addition to many plans, no nationwide data exist regarding how widespread its use is, or how effective it is at reducing costs. However, some third party payers can provide data from their own plans. The Blue Cross and Blue Shield Association has gathered evidence showing preadmission certification's growing popularity among employers. By December 1983, 18 Blue Cross plans had adopted preadmission certification for at least one account. By December 1984, this number had grown to 45 plans and, as of June 1985, 60 out of 71 plans had implemented preadmission certification for at least one

account. By June 1986, almost all Blues Cross plans are expected to offer preadmission certification to most accounts.

Administration

Under most preadmission certification plans, the beneficiary initiates the review process by phoning the certification agency's representative (usually an R.N.) prior to admission and providing information such as patient name, address, age, physician name and hospital. The beneficiary also informs his or her physician of the third-party payer's preadmission review requirements. Physicians are often given the option of reporting clinical information either by phone or by mail. The review organization may deny reimbursement for inappropriate admissions, usually recommending outpatient treatment. Physicians can appeal the review agency's decision, thereby referring the case for re-evaluation by a review agency physician.

Whether to adopt preadmission certification is decided by purchasers on an account-specific basis. Preadmission certification may be suggested by the third-party payer during the bidding process in an effort to offer a lower premium. Adoption of this policy may also be decided during collective bargaining negotiations between union and management. This negotiation process allows preadmission certification as well as other utilization review mechanisms to be tailored to an account's specific needs. Additionally, characteristics of local medical care delivery systems determine whether preadmission certification is appropriate at all. For example, preadmission certification is not expected to spread to rural areas where options for care (especially outpatient surgery) are limited and accounts are small.

Effects on Utilization

It is still early to determine preadmission certification's effect upon costs and utilization. However, preliminary evidence suggests preadmission certification can reduce admission rates. Blue Cross of Central Ohio has one of the oldest preadmission certification programs—called "Blue Chip." Between January 1983 and September 1984 the number of admissions within preadmission parameters (elective admissions) in accounts using Blue Chip decreased by 19.1 percent, compared to a 6.1 percent decrease for the same type of admissions in the insurer's other accounts. Whether through internal data like the above or more subjective bases, many of the insurers that we talked with believed preadmission certification to be highly effective.

Many of the studies of preadmission certification are incomplete, however. In addition to estimating the decline in admissions from the activity, one needs to know what happened to those patients. Were they treated on an outpatient basis? What were the costs of the outpatient services?

Problems

Although Blue Cross reports employers and beneficiaries are satisfied with the ease of administering preadmission certification and the savings attributed to it, some drawbacks are evident. The multitude of plans causes problems for hospitals. Because no standard review system exists, a single hospital may have to deal with a large number of review entities, each having a different preadmission protocol.

One large metropolitan hospital reported dealing with 47 different preadmission review programs. Such hospitals are forced to meet heavy administrative demands in order to receive full reimbursement.

The problem is further complicated by the inability to monitor the quality or legitimacy of all private review organizations. Neither hospitals nor patients can be certain that all reviewers will respect the confidentiality of patient information. No mechanism exists to assure that reviewers have appropriate professional qualifications or that the criteria used in evaluating proposed admissions are sound. To date, these concerns have not received extensive attention because most large third-party payers pioneering preadmission review employ only registered nurses and physicians. Large insurers, such as Blue Cross, claim their admission requests are evaluated according to carefully established criteria. However, the problem of potential abuse could become more acute as preadmission certification is adopted by small, self-insured employers contracting with newly established review organizations.

According to the Blue Cross-Blue Shield Association, physicians have cooperated with preadmission certification policies. Should a physician deliver services deemed unnecessary by the review board, third-party reimbursement is withheld, leaving either the hospital or patient responsible for payment. These are powerful sanctions, especially for physicians practicing in competitive markets.

There has been some physician dissatisfaction with preadmission certification, leading the American Medical Association (AMA) to pass a number of resolutions opposing the practice. Physician dissatisfaction tends to be centered on two areas. First, there is concern over a review organization's insensitivity to unique needs of certain populations and special characteristics of local medical care delivery facilities. Localized development of preadmission certification and utilization review is one way of combating this problem. Second, there are complaints of excess paperwork. Insurers claim to have reduced this burden by handling preadmission certification over the telephone. Oral communication allows efficient negotiation between physicians and the review board's representative. It also serves to inform physicians of the latest standards for care.

Medicare

Originally, this section was going to discuss the feasibility of using preadmission certification in Medicare. However, since the Congress requested this report, preadmission certification in the Medicare program has become a reality. Therefore, the following section focuses upon current use of preadmission certification in Medicare rather than its feasibility. Discussed are the program's administration and scope, along with current and potential future problems. Since research and data on this relatively new program are highly limited, most of the information presented comes from discussions with representatives of a number of PROs.

Background

The PROs are an important component of Medicare's prospective payment system. While paying fixed rates per hospital admission creates incentives to cut costs per admission, the incentives concerning the number of admissions are not clear (see above). In many PROs, preadmission certification is the primary mechanism to reduce inappropriate admissions.

By November 15, 1984, PROs were established in each State and U.S. territory. PROs are review organizations, in many cases former PSROs, contracted by HCFA to review care received by Medicare beneficiaries. All of the contracts require preadmission review to be performed for at least five procedures selected from a list of procedures that may be safely performed in an outpatient setting. HCFA has granted PROs significant flexibility in designing a review system to suit local health care needs and practice patterns. Some PROs limit preadmission review to five procedures while others subject all elective admissions to review.

Administration

Medicare's preadmission certification process is usually triggered by a physician phoning the local PRO. Some hospitals provide PRO–physician liaison personnel to present admission requests to the PRO, but most physicians prefer to handle the process themselves. As in the private sector, requests for admission are usually received by a nurse who uses established criteria to decide whether to approve the

admission. Questionable or denied admission requests must be sent to a physician for further evaluation.

Review criteria are established by individual PROs, and they therefore differ somewhat from State to State. Consistency is derived from HCFA's coverage guidelines as well as from PROs basing their review upon AMA or other professional association standards, with small deviations to suit local conditions. Generally, the most important standards are those regarding whether a procedure or postoperative testing may be performed on an outpatient basis.

As in the private sector, hospitals are generally held liable for charges related to admissions requiring but not receiving preadmission certification. Exceptions to this policy include the following:

1. Medicare will reimburse charges for all elective admissions meeting preadmission review standards, even if not reviewed pre-admission. However, reimbursement is delayed until these cases undergo concurrent or retrospective review.

2. Patients are free to assume responsibility for charges on admissions not meeting preadmission certification standards. However, if the patient is not informed of preadmission certification denial, he or she is not responsible for charges.

Retrospective review is also an important component of the utilization review process, complementing preadmission certification. PROs are responsible for

performing at least a 5 percent random sample of all admissions. A majority of the PROs, however, have targeted a larger sample size, especially for those cases that received approval through pre-admission certification. The latter was instituted in to verify that the pre-admission approval was indeed appropriate. This process can serve to verify physicians' pre-admission plans of treatment and lead to withheld reimbursement for admissions that turn out to be inappropriate.

Effects on Utilization

Because the first PROs were not operational until July 1984, no data base summarizing the nationwide effect of preadmission certification has been developed yet. In December 1985, HCFA began gathering sufficient information to begin estimating effects of preadmission certification upon utilization and Medicare expenditures. The regression analysis on aggregate admissions reported in Section II, however, is suggestive of a major PRO effect on utilization, much of which may be from preadmission review.

Admission denial rate data are available for all States, but physicians' behavioral responses to preadmission certification limit the usefulness of such data. During July 1985, Rand analysts telephoned several PROs. Many of these PROs cite a "sentinel effect" among physicians as the reason for declining admissions. Because of preadmission certification, physicians tend to request only admissions that they expect will be approved. So, for example, Wisconsin's estimates that 3-4 percent of requested admissions are denied understate the full impact of preadmission certification. Total declines in admissions relative to a control group, rather than just denial rates, must be considered when assessing the effects of preadmission certification.

Alabama's PRO is one of the few providing admission rate data, citing a reduction of over 22,000 Medicare admissions in the 6 month period (July-December 1984) after initiating preadmission certification. This 18-percent cut in admissions resulted in an estimated $45 million savings on inpatient expenditures. The portion that has been offset by transfer of cases to the outpatient setting has not been estimated, however.

Physician Cooperation and Attitudes

It is difficult to generalize about physicians' attitudes towards preadmission certification in Medicare. Traditionally, the AMA has opposed government intervention in medical practice. However, many individual physicians, upon recognizing the strength of political and social pressures to control health care costs, agree with the need for utilization review, and cooperate in preadmission review. Therefore, it is not surprising that PROs cite relatively little organized physician opposition to preadmission certification. The most vocal opposition has come from physician organizations in states where PSROs were weak and physicians were not used to any government or private organization overseeing their practice patterns. But even in these areas, most physicians have cooperated with utilization review procedures.

Medicare's unwillingness to pay for admissions that do not meet preadmission standards provides major incentives for physicians to cooperate with preadmission review policies. By circumventing preadmission review, uncooperative physicians jeopardize their relationships with hospitals and patients. As in the private sector,

this is a particularly critical motivating factor in areas where physicians are in excess supply and must compete for patients.

Additionally, several PROs cite an emphasis on physician education. In the process of focusing on preadmission review procedures and goals, these PROs also inform physicians of the latest technology and standards for outpatient surgery. Physicians become more comfortable with preadmission certification as they recognize that utilization review is not designed to question their professional judgment. Rather, they acknowledge that preadmission evaluation is designed to reduce costs by urging M.D.s to take advantage of new, more efficient methods of delivering care.

Physicians' complaints about preadmission certification may be divided into two categories; philosophical and operational. On the philosophical side, many physicians resent government policies that threaten professional autonomy. Specifically, these physicians believe that all utilization review should be voluntary, as well as physician controlled. Their cooperation may have been enhanced by some States' contracting with physician groups to run PROs. Physicians are further involved in the review process as all PROs employ physician consultants to review controversial admission requests.

Operational complaints regarding preadmission certification include those typically found in bureaucratic organizations. Occasionally, physicians are frustrated to find PROs' phone lines frequently busy or open for only 8 hours each work day. Complaints also center on excessive amounts of paperwork, a problem complicated by the large number of private review entities many physicians must

deal with. These inconveniences often seem trivial relative to costs associated with unnecessary hospitalization. However, they may add up to substantial time costs and may on occasion jeopardize the delivery of urgent care. On site review is a possible solution to these potentially serious problems.

CURRENT ISSUES

Research With Outpatient Data

Because transferring patients from inpatient to less costly outpatient facilities is one of the main goals of preadmission certification policies, increased utilization of outpatient services is likely. But some procedures may not be performed at all, reflecting either an increase or decrease in quality of care. Reduced frequency may mean either that patients are going without necessary treatment or that a specific procedure was performed too often in the first place. Reduced frequency for simple procedures, coupled with increased numbers of similar yet more complex inpatient procedures, could indicate "gaming" of the system. Knowing they cannot get a patient admitted for a simple procedure, doctors may request admission for something more complex. Increased collection and analysis of outpatient data is crucial to fully examining the effects of preadmission certification upon utilization and quality of care.

Should PreAdmission Certification be Required For All Admissions?

PROs may conduct preadmission certification on from five DRGs to all elective admissions. The administrative costs of such extensive preadmission certification are high, possibly exceeding the benefits at the margin at some point. Undoubtedly, some "elective" procedures routinely subject to preadmission certification are complex enough to warrant hospitalization consistently. There seems to be little reason to require preadmission review for these cases. Once sufficient data are collected, these admissions should be easy to identify since their frequency should not have been effected by the implementation of preadmission certification. Such admissions could be reclassified as necessary (if not urgent) procedures.

CONCLUSION

Due to increased cost consciousness of government, employers, beneficiaries, and private sector third-party payers, preadmission certification has grown in popularity at a rapid pace. It has become a primary and seemingly effective cost containment mechanism in many plans. Because the policy is so new, and definitive data so scarce, one cannot yet estimate the effects of preadmission certification upon utilization. Research on overall cost savings (offsetting the costs of increased outpatient services), and on impacts on the quality of care, is further away.

To date, preadmission certification has exhibited significant cost reducing potential, but problems apparently remain in both public and private sectors. In the private sector, the lack of regulatory or monitoring mechanisms leave preadmission certification programs open to abuse. Insufficient data and scanty analysis leave unanswered questions regarding the ultimate effectiveness of Medicare preadmission certification.

As utilization review policies evolve, approximate solutions to some of today's questions may become self evident. But such approximations may not be sound enough to base health policy decisions upon. Preadmission certification and utilization review affect significant human and financial resources. Therefore, the effects and development of these programs warrant comprehensive and carefully planned studies.

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APPENDICES

EXCERPTS FROM THE 1984 ANNUAL PPS IMPACT REPORT ON MEDICARE ADMISSION RATES

Findings

Admissions

When P.L. 98-21 was enacted, creating the Medicare Hospital Prospective Payment System, it was anticipated that the new system, in paying on a per case rather than on the previous per diem basis, would provide an incentive for hospitals to increase the volume of admissions. Since each extra admission generates additional revenue for the hospital, it was thought that financial considerations would encourage the admission of any case for which the cost of treatment is expected to be less than the relevant DRG payment rate. In addition, with the average length of hospital stays expected to decrease (see below), an incentive would exist to fill the rising number of empty beds.

For this reason, the Congress mandated that a study be conducted of the impact of the PPS on hospital admissions, and that a report be submitted in December 1985 on "the feasibility of making a volume adjustment in the DRG prospective payment rates or requiring preadmission certification in order to minimize the incentive to increase admissions."[2]

Table 6.5 presents the annual number of Medicare short-stay hospital admissions for the period 1978-84, along with the rate of admissions per thousand

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[2] P.L. 98-21, Section 603(a)(2)(C).

Table 6.4

DISTRIBUTION OF PPS BILLS BY HOSPITAL GROUP FROM PPS IMPACT DATA BASE

Group	PPS Bills as a Percentage of "PPS-Eligible" Bills	Percentage of PPS Bills in Each Group
All Groups	41.2	100.0
By Census Division		
New England	81.5	6.6
Middle Atlantic	1.2	0.2
South Atlantic	58.5	27.2
East North Central	43.2	21.2
East South Central	36.9	8.5
West North Central	38.0	9.5
West South Central	39.4	12.2
Mountain	33.9	3.6
Pacific	35.0	10.9
By Urbanicity		
Urban	39.7	69.6
Rural	44.8	30.4
By Teaching Status		
Non-Teaching	42.9	69.8
Teaching-Low	40.0	27.6
Teaching-High	23.3	2.6
By Ownership		
Not-for-Profit	41.1	69.0
Proprietary	32.3	8.1
Government	45.9	23.0

Source: HCFA, Bureau of Data Management and Strategy.

Table 6.5

MEDICARE SHORT-STAY HOSPITAL ADMISSIONS AND RATE PER THOUSAND HOSPITAL INSURANCE ENROLLEES 1978-84

Year	Admissions (in thousands)	Percent Change	Enrollment as of July 1 (in thousands)	Admissions Per Thousand Enrollees	Percent Change
CY 1978	9,444	---	26,777	353	---
CY 1979	9,788	+3.6	27,459	356	+0.8
CY 1980	10,430	+6.6	28,067	372	+4.5
CY 1981	10,858	+4.1	28,590	380	+2.2
FY 1982	11,220	+3.3	29,069	386	+1.6
FY 1983	11,696	+4.2	29,587	395	+2.3
FY 1984	11,495[a]	-1.7	30,141[b]	381	-3.5

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[a] Admissions data for FY 1984, adjusted to account for processing lags.

[b] Enrollment figures for July 1, 1984, as projected by HCFA's Bureau of Data Management and Strategy.

Source: HCFA, Bureau of Data Management and Strategy.

Medicare Hospital Insurance enrollees. As this table shows, Medicare admissions were steadily rising over the entire period prior to the implementation of the PPS, with the annual increase never falling below 3.3 percent. The figures for FY 1984, however, indicate a decrease in admissions of 1.7 percent--quite contrary to a priori expectations, as well as previous experience. Furthermore, when the growth in the beneficiary population is taken into account, the FY 1984 decrease (in admissions per thousand enrollees) is 3.5 percent.

Figure 6.1, based on data from the American Hospital Association (AHA), compares seasonally-adjusted monthly admission patterns over a two-year period for patients aged 65 and over and those under age 65. These patterns show that, while admissions were declining almost continuously for the younger group, the level of admissions among the older group has been fairly constant since early in 1983--with the exception of a slight decrease coinciding with the implementation of the PPS.

It thus appears from the available data that the increase in admissions that was anticipated in response to the PPS has not yet materialized. While patients aged 65 and over comprise an increasing proportion of total admissions, the numbers of admissions for both the younger and the older group are declining. Future reports in this series will continue to monitor admission trends under prospective payment. In addition, analysis will focus on admission patterns among various classes of hospitals,[3] and on the determinants of these admission patterns.

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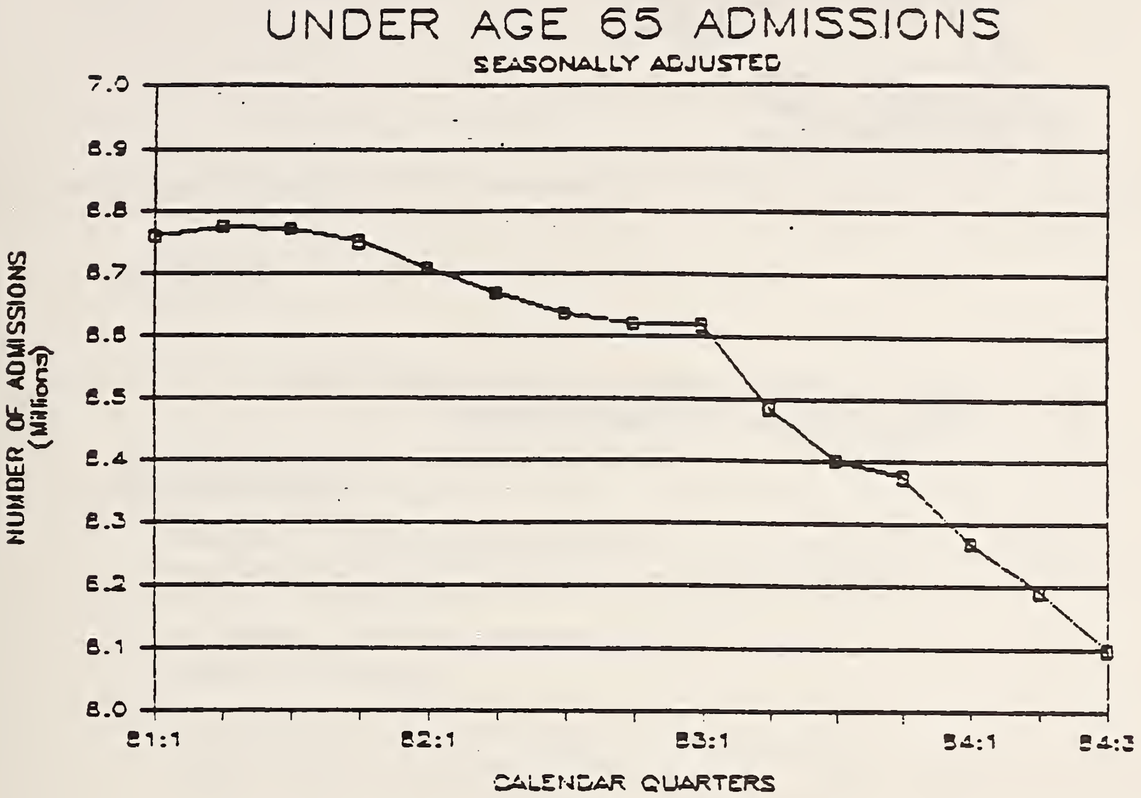
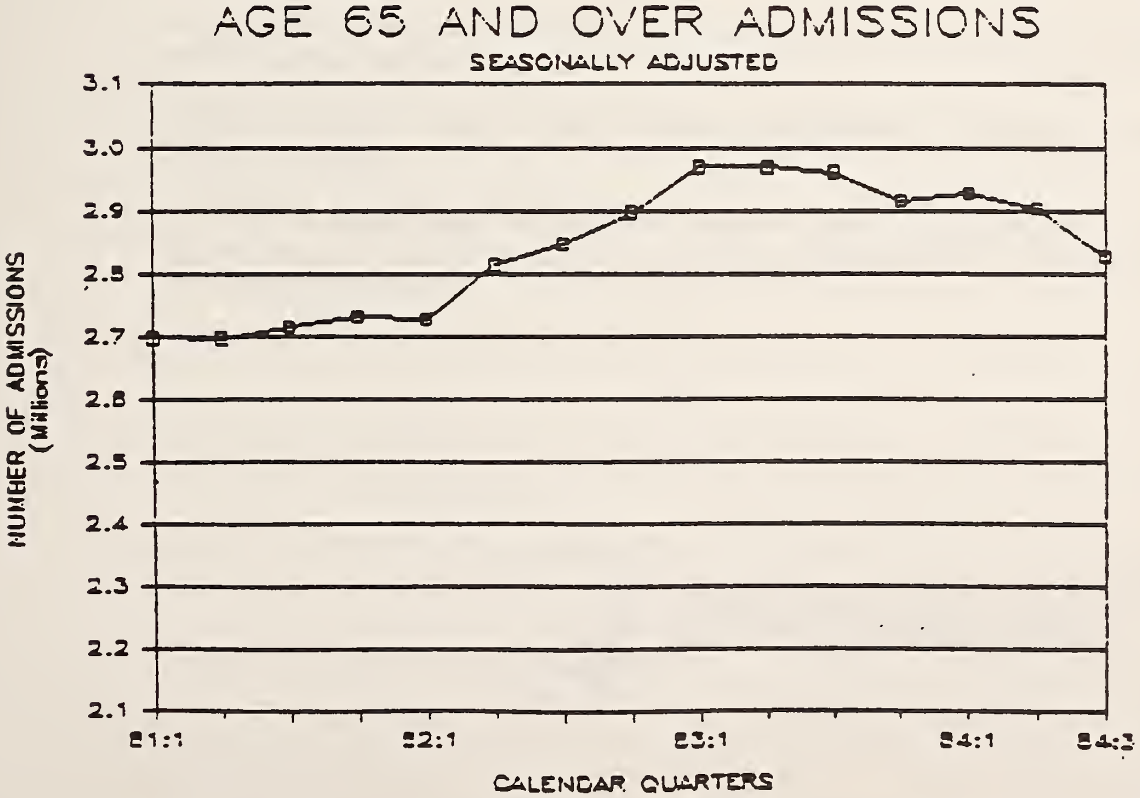
[3] Such an analysis could not be done with the data currently available, because admission notice data cannot be disaggregated by type of hospital, and there is no way to calculate an appropriate denominator for admission rates by type of hospital.

Figure 6.1

SEASONALLY-ADJUSTED ADMISSION TRENDS





Source: Trends, Dec. 1984. Copyright 1984 by the American Hospital Association. For more information about AHA data, call (312) 280-6531.

Health Care Spending Bulletin

April 1985

No. 85-02

Short-Stay Hospital Admission Rates and Length of Stay Decreased Sharply in Fiscal Year 1984

Admission Rates

- Short-stay hospital admission rates per 1,000 persons enrolled under Hospital Insurance decreased 3.5 percent from 1983 to 1984.
- Admission rates in waiver States decreased .6 percent and in nonwaiver States, 4.1 percent
- The largest rates of decrease were observed in the North Central Census Region (down 5.3 percent) and the Southern Census Region (down 3.9 percent), the two regions with historically highest admission rates.

Average Length of Stay

- Average length of stay decreased from 10 days in 1983 to 9 days in 1984 for all areas, a 1 day decline.
- Average length of stay in waiver States decreased .6 days and, in nonwaiver States, 1.1 days
- The largest percentage decrease in length of stay was observed in the North Central States (down 12.5 percent), an area which showed the sharpest drops in admission rates as well.

U.S. Department of Health and Human Services
Health Care Financing Administration
Bureau of Data Management and Strategy

Source and Limitations of the Data

- **Admission Rates**

  The number of short-stay hospital admissions are derived from admission notices reported by the intermediaries to the Health Care Financing Administration. The admission counts reflect the location of hospitals as of July 1 of the indicated year. Consequently, the admission rate may be artificially high in areas such as the District of Columbia where a large proportion of admissions are attributable to enrollees residing outside the geographic area.

- **Average length of stay**

  Includes all hospital days reported for Medicare discharges, whether covered or not, calculated on a per discharge basis. The lengths of stay are aggregated by location of the hospital rather than by location of the beneficiary.

Table I

Medicare Admission Rates for Short-Stay Hospitals
Fiscal Years 1982-1984
Prepared by the Division of Information Analysis, HCFA

State	1982 Admissions Per 1000 Enrollees	1983 Admissions Per 1000 Enrollees	1984 Admissions Per 1000 Enrollees	Percent Change, 1982-1983	Percent Change, 1983-1984	Percent Change, 1982-198
** Northeastern States						
* New England						
Connecticut	313	318	317	1.60	-0.31	1.28
Maine	377	381	370	1.06	-2.89	-1.86
Massachusetts	373	392	387	5.09	-1.28	3.75
New Hampshire	358	366	350	2.23	-4.37	-2.23
Rhode Island	313	324	333	3.51	2.78	6.39
Vermont	373	374	344	0.27	-8.02	-7.77
* Middle Atlantic						
New Jersey	330	338	337	2.42	-0.30	2.12
New York	332	337	333	1.51	-1.19	0.30
Pennsylvania	379	394	395	3.96	0.25	4.22
** North Central States						
* East North Central						
Illinois	392	406	396	3.57	-2.46	1.02
Indiana	408	424	406	3.92	-4.25	-0.49
Michigan	385	398	387	3.38	-2.76	0.52
Ohio	388	404	386	4.12	-4.46	-0.52
Wisconsin	372	381	361	2.42	-5.25	-2.96
* West North Central						
Iowa	432	414	355	-4.17	-14.25	-17.82
Kansas	454	447	403	-1.54	-9.84	-11.23
Minnesota	414	421	375	1.69	-10.93	-9.42
Missouri	454	460	438	1.32	-4.78	-3.52
Nebraska	471	480	439	1.91	-8.54	-6.79
North Dakota	522	546	521	4.60	-4.58	-0.19
South Dakota	459	472	440	2.83	-6.78	-4.14

Table 1

Medicare Admission Rates for Short-Stay Hospitals
Fiscal Years 1982-1984
Prepared by the Division of Information Analysis, HCFA

State	1982 Admissions Per 1000 Enrollees	1983 Admissions Per 1000 Enrollees	1984 Admissions Per 1000 Enrollees	Percent Change, 1982-1983	Percent Change, 1983-1984	Percen Change 1982-19
•• Southern States						
• South Atlantic						
Delaware	318	332	329	4.40	-0.90	3.46
District of Columbia	438	461	465	5.25	0.87	6.16
Florida	393	403	388	2.54	-3.72	-1.27
Georgia	442	460	450	4.07	-2.17	1.81
Maryland	354	372	381	5.08	2.42	7.6
North Carolina	390	397	376	1.79	-5.29	-3.5
South Carolina	356	370	358	3.93	-3.24	0.5
Virginia	391	401	394	2.56	-1.75	0.77
West Virginia	451	474	454	5.10	-4.22	0.67
• East South Central						
Alabama	477	495	462	3.77	-6.67	-3.1
Kentucky	439	448	418	2.05	-6.70	-4.7
Mississippi	487	508	481	4.31	-5.31	-1.2
Tennessee	503	520	513	3.38	-1.35	1.9
• West South Central						
Arkansas	480	494	464	2.92	-6.07	-3.3
Louisiana	448	466	462	4.02	-0.86	3.1
Oklahoma	433	442	412	2.08	-6.79	-4.8
Texas	464	474	448	2.16	-5.49	-3.4

Table 1

Medicare Admission Rates for Short-Stay Hospitals
Fiscal Years 1982-1984
Prepared by the Division of Information Analysis, HCFA

State	1982 Admissions Per 1000 Enrollees	1983 Admissions Per 1000 Enrollees	1984 Admissions Per 1000 Enrollees	Percent Change, 1982-1983	Percent Change, 1983-1984	Percent Change, 1982-1984
•• Western States						
• Mountain						
Arizona	351	352	345	0.28	-1.99	-1.71
Colorado	412	405	370	-1.70	-8.64	-10.19
Idaho	352	356	326	1.14	-8.43	-7.39
Montana	420	416	384	-0.95	-7.69	-8.57
Nevada	422	404	403	-4.27	-0.25	-4.50
New Mexico	347	351	345	1.15	-1.71	-0.58
Utah	341	334	324	-2.05	-2.99	-4.99
Wyoming	364	371	357	1.92	-3.77	-1.92
• Pacific						
Alaska	358	355	357	-0.84	0.56	-0.28
California	350	353	343	0.86	-2.83	-2.00
Hawaii	278	279	266	0.36	-4.66	-4.32
Oregon	354	359	341	1.41	-5.01	-3.67
Washington	351	356	336	1.42	-5.62	-4.27
•• Outlying Areas						
•						
Puerto Rico	184	191	196	3.80	2.62	6.52
Virgin Islands	192	221	210	15.10	-4.98	9.38
Other Outlying Areas	215	226	202	5.12	-10.62	-6.05

Table 2

Medicare Average Length of Stay in Short-Stay Hospitals
Fiscal Years 1982-1984
National and Census Region Totals
Prepared by the Division of Information Analysis, HCFA

	1982 Average Length of Stay	1983 Average Length of Stay	1984 Average Length of Stay	Percent Change, 1982-1983	Percent Change, 1983-1984	Percent Change, 1982-1984
All Areas	10.30	9.96	8.99	-3.30	-9.74	-12.72
U.S.	10.30	9.96	8.99	-3.30	-9.74	-12.72
Northeastern States	12.75	12.31	11.50	-3.45	-6.58	-9.80
North Central States	10.54	10.10	8.84	-4.17	-12.48	-16.13
Southern States	9.49	9.26	8.29	-2.42	-10.48	-12.64
Western States	8.46	8.17	7.37	-3.43	-9.79	-12.88
** Waiver States	13.54	13.11	12.46	-3.18	-4.96	-7.98
** Non-Waiver States	9.78	9.46	8.42	-3.27	-10.99	-13.91

Table 2

Medicare Average Length of Stay in Short-Stay Hospitals
Fiscal Years 1982-1984
Prepared by the Division of Information Analysis, HCFA

State	1982 Average Length of Stay	1983 Average Length of Stay	1984 Average Length of Stay	Percent Change, 1982-1983	Percent Change, 1983-1984	Percent Change, 1982-1984
** Western States						
* Mountain						
Arizona	8.85	8.76	7.79	-1.02	-11.07	-11.98
Colorado	9.27	8.76	7.70	-5.50	-12.10	-16.94
Idaho	7.30	7.08	6.44	-3.01	-9.04	-11.78
Montana	7.67	7.60	6.96	-0.91	-8.42	-9.26
Nevada	8.48	8.35	7.75	-1.53	-7.19	-8.61
New Mexico	8.19	8.01	7.33	-2.20	-8.49	-10.50
Utah	7.61	7.40	6.56	-2.76	-11.35	-13.80
Wyoming	7.92	7.97	7.41	0.63	-7.03	-6.44
* Pacific						
Alaska	8.17	8.50	7.42	4.04	-12.71	-9.18
California	8.67	8.34	7.56	-3.81	-9.35	-12.80
Hawaii	9.84	9.48	8.48	-3.66	-10.55	-13.82
Oregon	7.73	7.40	6.47	-4.27	-12.57	-16.30
Washington	7.58	7.42	6.68	-2.11	-9.97	-11.87
** Outlying Areas						
*						
Puerto Rico	9.42	9.01	8.60	-4.35	-4.55	-8.70
Virgin Islands	13.60	13.57	11.83	-0.22	-12.82	-13.01
Other Outlying Areas	8.78	8.75	7.68	-0.34	-12.23	-12.53

Table 2

Medicare Average Length of Stay in Short-Stay Hospitals
Fiscal Years 1982-1984
Prepared by the Division of Information Analysis, HCFA

State	1982 Average Length of Stay	1983 Average Length of Stay	1984 Average Length of Stay	Percent Change, 1982-1983	Percent Change, 1983-1984	Percent Change, 1982-1984
•• Southern States						
• South Atlantic						
Delaware	11.72	11.31	10.41	-3.50	-7.96	-11.18
District of Columbia	14.07	13.58	12.08	-3.48	-11.05	-14.14
Florida	9.59	9.36	8.34	-2.40	-10.90	-13.03
Georgia	8.28	8.17	7.42	-1.33	-9.18	-10.39
Maryland	11.94	11.34	10.32	-5.03	-8.99	-13.57
North Carolina	10.12	9.97	8.58	-1.48	-13.94	-15.22
South Carolina	9.81	9.62	8.52	-1.94	-11.43	-13.15
Virginia	10.86	10.26	9.16	-5.52	-10.72	-15.65
West Virginia	9.58	9.29	8.02	-3.03	-13.67	-16.28
• East South Central						
Alabama	9.11	8.78	8.07	-3.62	-8.09	-11.42
Kentucky	9.17	9.15	8.34	-0.22	-8.85	-9.05
Mississippi	9.06	8.94	7.71	-1.32	-13.76	-14.90
Tennessee	9.58	9.41	8.62	-1.77	-8.40	-10.02
• West South Central						
Arkansas	8.18	8.04	7.27	-1.71	-9.58	-11.12
Louisiana	8.95	8.66	7.69	-3.24	-11.20	-14.08
Oklahoma	8.61	8.51	7.73	-1.16	-9.17	-10.22
Texas	9.23	8.99	8.05	-2.60	-10.46	-12.78

Table 2

Medicare Average Length of Stay in Short-Stay Hospitals
Fiscal Years 1982-1984
Prepared by the Division of Information Analysis, HCFA

State	1982 Average Length of Stay	1983 Average Length of Stay	1984 Average Length of Stay	Percent Change, 1982-1983	Percent Change, 1983-1984	Percent Change, 1982-1984
•• Northeastern States						
• New England						
••••••••icut	11.32	10.93	9.54	-3.45	-12.72	-15.72
Maine	9.30	9.01	8.25	-3.12	-8.44	-11.29
Massachusetts	12.86	12.20	11.44	-5.13	-6.23	-11.04
New Hampshire	9.73	9.28	8.54	-4.62	-7.97	-12.23
Rhode Island	12.31	11.20	10.20	-9.02	-8.93	-17.14
Vermont	10.67	10.20	8.80	-4.40	-13.73	-17.53
• Middle Atlantic						
New Jersey	12.58	12.39	11.90	-1.51	-3.95	-5.41
New York	14.51	14.14	13.56	-2.55	-4.10	-6.55
Pennsylvania	11.60	11.11	10.01	-4.22	-9.90	-13.71
•• North Central States						
• East North Central						
Illinois	11.28	10.83	9.62	-3.99	-11.17	-14.72
Indiana	10.59	10.19	8.40	-3.78	-17.57	-20.68
Michigan	10.74	10.42	9.29	-2.98	-10.84	-13.50
Ohio	11.15	10.60	9.26	-4.93	-12.64	-16.95
Wisconsin	10.01	9.45	8.27	-5.59	-12.49	-17.38
• West North Central						
Iowa	9.78	9.16	8.06	-6.34	-12.01	-17.59
Kansas	10.59	10.30	8.63	-2.74	-16.21	-18.51
Minnesota	9.41	8.87	7.62	-5.74	-14.09	-19.02
Missouri	10.48	10.03	8.82	-4.29	-12.06	-15.84
Nebraska	8.99	8.81	8.00	-2.00	-9.19	-11.01
North Dakota	8.62	8.61	7.71	-0.12	-10.45	-10.56
South Dakota	9.78	9.31	7.59	-4.81	-18.47	-22.39

Table 2

Medicare Average Length of Stay in Short-Stay Hospitals
Fiscal Years 1982-1984
By Census Division
Prepared by the Division of Information Analysis, HCFA

	1982 Average Length of Stay	1983 Average Length of Stay	1984 Average Length of Stay	Percent Change, 1982-1983	Percent Change, 1983-1984	Percent Change, 1982-1984
** Northeastern States						
New England	11.81	11.25	10.33	-4.74	-8.18	-12.53
Middle Atlantic	13.07	12.67	11.90	-3.06	-6.08	-8.95
** North Central States						
East North Central	10.89	10.43	9.13	-4.22	-12.46	-16.16
West North Central	9.90	9.47	8.25	-4.34	-12.88	-16.67
** Southern States						
South Atlantic	9.94	9.65	8.59	-2.92	-10.98	-13.58
East South Central	9.27	9.10	8.26	-1.83	-9.23	-10.90
West South Central	8.95	8.74	7.84	-2.35	-10.30	-12.40
** Western States						
Mountain	8.48	8.25	7.41	-2.71	-10.18	-12.62
Pacific	8.45	8.14	7.35	-3.67	-9.71	-13.02
** Outlying Areas						
Total	9.47	9.08	8.64	-4.12	-4.85	-8.76

THE SECRETARY OF HEALTH AND HUMAN SERVICES
WASHINGTON, D.C. 20201

The Honorable George Bush
President of the Senate
Washington, D.C. 20510

Dear Mr. President:

Enclosed is a Report to Congress, "Impact of Medicare Prospective Payment System on Admissions; Need for Volume Adjusters and/or Pre-Admission Certification." The report was prepared in response to the mandate in Section 603(a)(2)(C)(v) of P.L. 98-21, the Social Security Amendments of 1983. That section directed the Secretary of Health and Human Services to report on the impact of the Medicare hospital prospective payment system (PPS) "on hospital admissions and the feasibility of making a volume adjustment in the DRG payment rates or requiring pre-admission certification in order to minimize the incentive to increase admissions." The report was produced at a cost of approximately $20,000.

The report provides clear evidence from Rand Corporation analyses and HCFA program data that Medicare admission rates began falling for the first time in the history of the program in FY 1984. The decline spread through all age groups, all regions, and most States. It shows that admissions among the under 65 population began falling in 1981 and continued to fall. Thus, implementation of Medicare's PPS did not lead to an increase in Medicare admissions. The increased use of outpatient surgery is identified as one possible explanation.

We reviewed health economics literature concerning hospital incentives to increase admissions. Although the older literature suggested hospitals have large incentives to increase volumes, more recent literature suggests that this is seldom the case. Physician and patient counter-incentives to increasing admissions are also discussed in the report.

The experience of State-level rate-setting programs with volume adjusters is considered. Most of the programs reviewed have used some volume adjustment feature, but no research results could be located that isolated their effects on admission volume or cost.

The report then considers whether a volume adjuster should be legislated for Medicare's PPS. The Administration is against such a policy because the initial fears that PPS would create an admission volume increase problem have not been confirmed, and because volume adjusters might do more harm than good. The Department does not oppose, however, the special Medicare payment feature for sole community hospitals which experience large volume declines afforded by Section 601(d)(5)(C)(ii). The possible continuation of that feature is the subject of a separate report.

Lastly, the report reviews the limited available evaluation information about pre-admission certification programs. It notes that use of such programs is growing in the private sector. Also, all Peer Review Organizations (PROs) use pre-admission certification, at least for targeted DRGs. The Department strongly prefers continuing Medicare's multiple PRO approaches to either abandoning such programs or, at the opposite extreme, requiring pre-admission certification on all Medicare admissions.

Sincerely,

Otis R. Bowen, M.D.
Secretary

THE SECRETARY OF HEALTH AND HUMAN SERVICES
WASHINGTON, D.C. 20201

The Honorable Thomas P. O'Neill, Jr.
Speaker of the House of Representatives
Washington, D.C. 20515

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Sincerely,

Otis R. Bowen, M.D.
Secretary

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